AMENDMENTS TO THE SPECIFICATION

On page 6 please replace paragraph from line 28 to line 30 with the following

FIG. 15 is a block diagram of method steps employed to make one embodiment of a thin wall plated corrugated shaped annular disc for singulation saws; ~~and~~

On page 7 please replace paragraph from line 1 to line 4 with the following

FIG. 16 is a block diagram of method step employed to make the preferred embodiment thin wall corrugation shaped elements for singulation saws, very large disc saws, band saws, etc.
FIG. 17 is a block diagram showing two possible embodiments to manufacture the blade of the present disclosure; and
FIG 18 is a block diagram showing a preferred embodiment of the corrugated saw blade.

On page 8 please replace paragraph from line 1 to line 12 with the following

Refer now to FIG. 1 showing a prior art diamond impregnated resinoid cutting blade 10 used for cutting hard materials. In the embodiment shown, grooves 11 are pressed into the annular disc preferably as mirrored images on opposite sides leaving raised cutting teeth 12, as shown at A-A, but may be offset as shown at B-B. The reduced thickness blade is used for dicing wafers and has widths up to one-tenth of an inch thick. The angle θ of the groove 11 represents the deviation or degree of incline away from a true radial direction shown at line 227. Cooling water is applied radially inwardly and is expelled by centrifugal force. A complete description of this blade is found in U.S. Pat. No. 5,479,911 and is incorporated by reference herein.

On page 9, please replace the paragraph from line 7 to line 12, with the following

Refer now to FIG. 4 showing an enlarged partial section of a prior art cutting wheel ~~23~~ which comprises a supporting disc ~~24~~ to which a super-abrasive mass 25 is attached. The center 24 of the disc base member 23 is thinner than the mass 25 which is made by electro-depositing rows of individual super-abrasive particles.

Please replace the paragraph from page 9 line 22 to page 10 line 5 with the following

Refer now to FIG. 6 showing the wheel of FIG. 4 after the grooves 26 are filled in with rows of diamond to a level that coincides with the particles ~~27~~ 270 of bosses 28. This prior art patent shows and describes three layers of the same size diamonds 29 built up in the grooves 26 of base member 24 while a mask 31 is provided over the diamonds 27 which formed the raised bosses 28 shown in FIG. 3. After the mask 31 is removed, the top rows of diamonds 29 comprise 6 rows of particles and leave a gap 32 of 3 to 4 rows between adjacent bosses 28. The supporting disc 24 was 6 mils thick and the built up mass 25 is shown to be about two-thirds deeper or thicker. Blades used for cutting a granite block are described as having a total abrasive thickness of 1.5 millimeters (i.e. approximately 60 mils).

Please replace the paragraph from page 10 line 18 to page 11 line 7, with the following.

Refer now to FIG. 7 showing a schematic plan view of the present invention thin wall plated corrugated shaped annular disc blade 33 and to FIG. 8 showing an enlarged partial side elevation in section. In the preferred embodiment shown, the singulation blade 33 is made for use in a hub type fixture similar to hub ~~11~~ 13 shown in FIG. 2. The thickness TK (Figure 8) of the electro-deposited matrix ring 34 is preferably about 2 mils thick and is made thinner by six to eight microns than the thickness of the large diamond encapsulated in the matrix material which is preferably nickel. Thus, the points or raised edges of the large diamonds will be exposed by three to five microns in the preferred embodiment singulation saw blade. Since the thickness of the matrix material is about ten times the exposed height of the points of the single particle large diamonds, the encapsulated diamonds are held very firmly and do not have a tendency to tear loose at any place in the matrix. All diamonds are held by an optimum or maximum holding force which permits the novel singulation blade 33 to cut clean without clogging up to 4 inches per second cutting speeds which is higher than heretofore possible.

On page 12, please replace the paragraph from line 22 to line 29, with the following.

Refer now to FIG. 9 showing a plan view of a very large circular blade 35 having an edge or tip ~~37~~ made according to the present invention. The saw blade 35 comprises a thick metal blank or support 36 to which is attached an annular ring or annular corrugated singulation blade 37 that is corrugated as shown in

FIG. 8. Such blades 35 are easily fabricated in diameters of four or more feet and will smooth cut all hard material objects without clogging.

Please replace the paragraph from page 12 line 30 to page 13 line 12 with the following

Refer now to FIG. 10 showing an enlarged section in elevation taken at lines 10-10 of FIG. 9. The disc shaped support 36 is provided with a step-down annular ring-shaped shoulder 38 which is one mil deeper than the thickness of mounting flange 39 formed integrally with the annular corrugated singulation blade 37. In the example shown the depth D1 of the corrugation 37 is 10 mils which provide a clearance in the cut of 1 mil on each side of the support disc 36. The flange 39 may be attached to ~~shelf~~ shoulder 38 by numerous known welding techniques including spot or seam welding or by brazing or rod welding including tungsten inert gas (TIG) welding without a rod. ~~Corrugated~~ Annular rings 37 may be made in existing nickel baths up to twenty feet in diameter.

Please replace the paragraph from page 14 line 21 to page 15 line 2 with the following.
In the preferred embodiment also shown in Figure 18 of the corrugated saw blade, the matrix contains about fifty percent by volume of small diamonds completely encapsulated in the electro-deposited and formed matrix and the large diamond comprise about twenty percent more diamonds by volume, thus the total concentration of diamonds may be about eighty percent by volume. This more than doubles the concentration of diamonds by volume of prior art singulation or dicing saw blades. It is believed that this higher density concentration of diamonds encapsulated in the thin wall nickel matrix results in longer wear at higher cutting speeds. The object being cut is not as hard as the diamonds. Blade wear occurs when diamonds are torn loose from the matrix.

Please replace the paragraph from page 15, line 12 to page 16 line 3, with the following.

Refer now to FIG. 11 showing an isometric drawing of an electro-forming mandrel 41 having 120 ~~raised~~ lowered surfaces 42 and 120 ~~lowered~~ raised surfaces 43. Such mandrels may be machined from stainless steel or formed from a moldable material and plated with a surface equivalent to stainless steel which does not require a release agent such as electro-conductive carbon. The U.S. aircraft industry employs plating tanks over twenty feet in diameter for making aircraft parts and forming dies, thus, all large blades may be made in a single continuous plating

operation. The prior art blade shown and described in FIGS. 4 to 6 not only requires numerous sequential plating and masking operations, but by making a number of layers (five shown) the time has to be over five times a single matrix thickness blade made in corrugated form. In the preferred embodiment small singulation blade shown in FIGS. 7 and 8, the transition portion 44 is preferably forty-five degrees between surfaces 42 and 43. This enables the matrix ring 34 to be flexible and self-aligning when clamped in a hub or fixture. When the corrugated blade is made for large disc or for band saws, the blade may be deposited directly on the support disc or flexible band saw blade or made separately and attached as explained hereinbefore.

On page 16, please replace the paragraph from line 4 to line 16 with the following.

Refer now to FIG. 12 showing a schematic drawing in side elevation of a drill pipe 45 having a support 48 with a step-down end 46 adapted to receive a hollow corrugated cylinder 47 comprising a thin wall matrix of nickel holding a large concentration of large and small diamonds as explained hereinbefore. If the drill pipe is to be employed for extracting long cores of hard materials, the internal and external diameters of the pipe must have a larger I.D. and a small O.D. than the cylinder of diamonds encapsulated in nickel so that the core does not bind in the pipe. If the drill pipe is employed to cut through hard objects thinner than the length of the cylinder 47, the pipe or drill stem may be solid.

On page 17, please replace the paragraph from line 4 to line 29 with the following.

Refer again to FIG. ~~12~~ 13 and FIG. ~~13~~ 14 both showing a preferred embodiment singulation blade before cutting and after extensive cutting, respectively. The large diamonds 49 are shown having points or protrusions that extend outward from the matrix wall. As explained hereinbefore, not all diamonds have to be thicker than the walls 42 and 43 to provide the preferred protrusion height of three to five microns from the side walls 42, 43 and transition wall 44. In one example a layer of copper 3 to 5 microns is deposited on the mandrel with the large diamonds 49. Then the nickel matrix is deposited on the copper with over fifty percent by volume of small diamonds not shown. Control plating is stopped before covering the top points of the large diamonds leaving a predetermined protrusion of 3 to 5 microns. The flash layer of copper is preferably removed before the blade is used for singulation. Other methods of providing equal protrusion on both sides of the bosses or surfaces 42 and 43 have been tried such as pressing the diamonds into a soft

mandrel or a soft layer and then plating the matrix over the diamonds. Plating a soft removable layer first has advantages. In the broadest scope of the invention the large diamonds are introduced into the matrix first, followed by the small diamonds. When the high points on the large diamonds protrude a predetermined amount the plating is stopped and a usable blade is removed from the mandrel.

On page 19, please replace the paragraph from line 3 to line 16 with the following.

Refer now to FIG. 16 showing a block diagram of method steps which may be employed to make the novel thin wall corrugated shaped elements used for different types of singulation saws. In particular, the steps shown in Figure 16 are: step 57, prepare a corrugated mandrel to receive plating; step 58, plate large diamond (30 to 80 microns) in a copper bath to predetermined deepth of copper (5 to 8 microns); step 59, switch copper bath to nickel bath; step 60, plate small diamonds (3 to 18 microns) in high concentration (up to 50% by volume); step 61, stop plating while large diamonds are exposed through the top of nickel; step 62, remove the corrugated plated blade; and step 63 remove the copper layer from the bottom side leaving large diamonds equally exposed on both sides. As explained hereinbefore it is possible to substitute a parting layer for steps 58 and 59 which results in the elimination of step 63. The purpose of FIG. 16 is to explain in detail seven steps that have been employed to make the novel corrugated thin wall singulation saw blade that may be used as made or attached to support disc or band saw blades. When steps 58 and 59 are omitted the large diamonds are preferably plated on a special mandrel that allows large diamonds to protrude from the bottom wall or boss and the small diamonds may be plated in the same bath from which the large diamonds were plated.

On page 19, please replace the paragraph from line 23 to line 29 with the following.

Thin wall diamond saw blades comprising diamonds are encapsulated into different hardnesses of a nickel matrix so that the cutting edge of the blades may withstand thousands of pounds of force per square inch of contract cutting area. No better way has been found than to make blades of different matrix metals and then test the blades under actual stress conditions. The saw blade can be manufactured in the embodiments shown on Figure 17.